ESP W🌐RLD

Critical thinking in ESL for postgraduate engineers: negotiating a discipline

Gavin Melles

Brief Bio

Gavin Melles, (University of Melbourne gmelles@unimelb.edu.au) works as a lecturer in the Faculty International Unit, Faculty of Medicine, Dentistry, and Health Sciences, Melbourne University. He also teaches in the Faculty of Engineering. He recently completed his Doctorate in Education (Deakin University, Australia), and holds a Masters in Linguistics (University of Costa Rica), and BArts (Auckland University, New Zealand). His research interests and writing are in the areas of curriculum evaluation, action research and English for Specific Purposes.

Abstract

Presenting Academic Discourse: Engineering Stream (145501) is a credit-based postgraduate unit incorporated into the curriculum for ESL Engineering students at Melbourne University. These students arrive in Australia with varying levels of English proficiency and have diverse cultural backgrounds and prior educational experiences. The course, taken in conjunction with other mainstream Engineering courses in their first semester aims to provide them with sufficient language and communicative skills to succeed in their chosen field. A key issue that has arisen and which emerges at the intersection of language/content and culture is critical thinking and writing. In this paper I discuss the role of critical thinking in program design and the response of students to critical thinking highlighting commonalities and differences.

INTRODUCTION

Total international enrolments at the University of Melbourne have increased between 2000 and 2002 from 4971 to 6768, and continue to grow, and the leading twelve countries ranked in order of enrolment numbers are, with one exception (USA) all located in Asia. Of the total international enrolment approximately 20% are enrolled in postgraduate programs of differing levels. This regional concentration of students is reflected in numbers and profiles of students enrolled in credit bearing EAP (English for Academic Purposes) courses, and accessing other forms of language support at Melbourne.

Among all faculties, the Engineering Faculty, has enjoyed an increase in enrolment second only to the Faculty of Economics and Commerce. The Faculty of Engineering currently offers eleven coursework and research postgraduate programs across sub-disciplines of engineering ranging through areas as diverse as environmental engineering, telecommunications, water resource management, and many others. One of the greatest growth areas – over 50% in the same period - has been coursework-based Masters programs, and students within these programs until recently have been the predominant student group in the ESL program described here over the last two years.

International postgraduate engineers at Melbourne University must either have completed studies in an English speaking environment to the satisfaction of faculty or have met TOEFL (Test of English as a Foreign Language) – 577 + TWE 4.5 - or IELTS (International English Language Testing System) – 6.5 overall + written 6..0 - requirements within the last 24 months. However, the university allows lower entry enrolment with a stipulation that students must complete an EAP program, during their first semester. This need was the key motivation for the development of the program referred to here, and described elsewhere (Melles, 2002). Students with these marginally lower scores formed the majority of students enrolled in the first semester of 2002, when the program ran for the first time as a stand-alone credit-based option. Students are required to

achieve an aggregate 70% for their three engineering discipline papers together with their EAP program, some are required to re-sit IELTS; research students are not assessed in this way. Over the last two semesters a growing ratio of postgraduate research students at Masters and PhD level has diversified the student population. The current increase in numbers of research students has, however, produced a tension that may need resolving in favour of a separate program for research only students in the future. In addition, students from non-engineering disciplines such as Chemistry, Land and Resource Management, and Information Systems have lead to a shift in the focus exclusively on engineering genres and content towards a format that foregrounds science and engineering as allied disciplines.

From remedial language fix to focus on critical analysis

Increasingly, programs to prepare international ESL postgraduates have focused on the extended rhetorical conventions of academic and discipline specific conventions (Biggs, Lai, Tang, & Lavelle, 1999). Although some scholars continue to question the relevance of discipline specific conventions to EAP (Spack, 1988), I reject a generalist approach preferring to engage with the discipline in their reading and writing texts and negotiating forms of assessment that students have come to believe strike a happy compromise. In ongoing consultation with faculty, in response to student demand, and in my own move against such a 'remedial' view, I have increasingly focused the curriculum around understanding and applying critical analysis to engineering texts and in assignment production.

Traditional linguistic approaches to Engineering English place emphasis on the acquisition by students of vocabulary and grammar assumed to be representative of the field, while focusing on paired down rhetorical units, e.g. the paragraph. This seems to be the approach adopted in textbooks aimed at teaching engineering language in non-English settings, e.g. (Glendinning & Glendinning, 1995; Johnson & Johnson, 1988). Johnson and Johnson (1988) themselves point to an underlying weakness in language-based approaches when they admit in their preface that there 'may be no such thing as General Engineering English'. Hawthorne (1997) argues that traditional EAP texts for engineers, e.g. (Johnson & Johnson, 1988), are inadequate for ESL engineers seeking employment in Australia. The danger with using traditional ESL texts in authentic university or workplace contexts is that texts chosen can be reduced to 'rhetorically simplified events' that 'teach forms of discourse they (teachers) themselves rarely or never use outside of the classroom' (Adam & Artemeva, 2002). As Feak (1996) points out in her review of Glendinning and Glendinning such theme-based texts take a very controlled and rather repetitive approach to reproduction of language structures by students, and require substantial supplementation for students to engage with the issues (Feak, 1996). Such approaches abstract academic literacy from social context and focus on the idea of language repair (Hyland & Hamp-Lyons, 2002). ESL students initiation into the academic community, therefore, involves processes more complex than the acquisition of discipline specific vocabulary (Starfield, 2001).

I avoid including discipline specific texts in reading resources, and instead focus on a collection of resources which refer to the classroom genres used for assessment, for example the literature review, and oral presentation. I have taken these sources from standard texts on engineering and science communication and writing, e.g. (Alley, 1996, 2003; Kschischang, 2000; Silyn-Roberts, 2000). During the first four weeks, which culminate in a critical review of an article from the student's field, I use existing texts to address cultural expectations about academic work (Bartlett, Holznkechy, & Thom, 1999), define critical text work (Facione, 1998) and review key aspects of grammar and writing, plus the characteristics of graduate text types, such as the summary (Swales & Feak, 1994). I also include a focus on the notion of text coherence as the underlying principle for adequate academic style (Gopen & Swan, 1990; Williams, 2000). Also threaded through the bi-weekly seminars of 90 minutes each are segments from an audiovisual program documenting the experience of four Australian engineering students attempting to manage their final year project. This text simultaneously raises questions about academic work in an Australian faculty of engineering, and serves as a listening comprehension text, from a discipline specific perspective. Although not all the students are from the electronic engineering field, it is a close pragmatic fit.

- Choice of article for written reviews needs to come from the sub-discipline of the students and meet quality criteria that are negotiated with me. I prefer authentic research genres, such as refereed journal articles from standard database sources, e.g. IEEE Xplore. I take responsibility for reading the original

texts for assignments 1 and 2 to make judgments about the content of work submitted. Over two years, such reading has familiarised me with a range of current topics in the sub-disciplines of engineering.

- Students are recommended to 'sustain' the same research topic through the assessment tasks so as to build cumulatively towards an extended understanding of an issue. Topic continuity also helps me identify an area with a student. In the case of the research students, the literature review takes on a different function and value compared with coursework students since it may be immediate preparation for thesis writing;
- The nature of acceptable critical text work is not fixed. Students are exposed through authentic genres and content in their discipline specific classes to different forms of critical text work. In addition, they come from cultural traditions where existing practices of critical analysis vary. Both sources of understanding then feed into a negotiated form of critical thinking and writing, which I propose through texts and teaching. The outcome in writing and speech, therefore, is necessarily particular, and while assessed on the basis of pre-established criteria, requires that I bear the above-mentioned factors in mind.

Students from Asia sometimes come not only with limited English proficiency but also with academic practices that make their negotiation of critical thinking and writing difficult. Although some of these practices may relate to general cultural dispositions, Ward (2001), for example, shows that engineering students in Thailand learn strategies to avoid reading engineering texts in English in their undergraduate training. Within the general academic community, citation practices within disciplines of engineering, e.g. electronic and mechanical, have shown to be different (Hyland, 1999; Tribble & Thompson, 2001), and within disciplines different genres, e.g. theses and journal articles, frequency and type of citation differ (Thompson & Tribble, 2001). Other differences between science and engineering disciplines at the level of dissertation writing have also been documented, and remain under-investigated as a source of information about the needs of non-native speaking postgraduates (Dong, 1998). The diversity of sub-disciplines represented in the program, the range of language proficiencies among students, the coursework and research aims of students, and the need for students to develop language and academic skills, has meant a gradual identification of appropriate genres and sub-genres of assessment for a diverse body of students.

Table 1: Assessment and teaching framework

	Aims	Process	Assumptions	Potential difficulties
Task 1 10% 750+ words	Critical Review of an article from the field	Draft assignments submitted in week 3 for evaluation, and final drafts due at the end of week 4. The article reviewed must be submitted for approval by lecturer and attached to final draft.	Model task 1 discussed and reviewed in class Nature of critical writing outlined Discussion of the nature of scientific writing Review of language and style issues	Nature of critical thinking and writing poorly understood Poor language proficiency makes the task too difficult Choice of article gives no scope for critical review No draft submitted and final draft full of avoidable errors
Task 2 15% 1000+ words	Critical comparison of two articles from the field	Draft assignments due in week 6 for comment, and final drafts due week 7. The articles reviewed must be submitted for approval by lecturer and attached to final draft.	Builds on the previous assignment topic Nature of summarizing and contrast, comparison discussed Model task 2 provided and discussed Peer review in class of drafts Criteria for assessment clearly established	Nature of critical thinking and writing still poorly understood Poor language proficiency continues to make the task too difficult Topic changed from first assignment Choice of articles gives no scope for critical review No draft submitted and

				final draft full of avoidable errors
Task 3 40% 3000+ words	Literature Review of at least twelve articles from the field	Draft assignments due in weeks 11 and 12 for individual tutorial feedback, final draft due a week later. Original articles not attached.	Model literature review analyzed in class Nature and format of literature review taught Focus on strategies of managing extended text and multiple source documents Criteria for assessment clearly established	Nature of critical thinking still poorly understood Poor language proficiency continues to make the task too difficult Change of topic from previous assignments Choice of articles gives little scope for critical review No draft submitted and final draft full of avoidable error
Task 4 30% 10 minutes	Oral presentation on the topic of the literature review	Draft presentations (PowerPoint?) due weeks 8 and 9, final presentations given in weeks 10-12	Analysis of oral presentation models Practice in-class oral presentations Readings on oral presentations included Criteria for assessment clearly established	Nature of critical thinking still not sufficiently developed Poor language proficiency continues to make the task difficult Topic unrelated to literature review Poor adaptation of presentation to audience No draft submitted and final draft full of avoidable error
Participation 5%	Involvement in class activities	Participation in group discussions, and other in-class activities such as peer reviews		Poor participation in class activities

Generic definitions of critical analysis for university students abound (eg. Allen, 1997; Baker, 1989; Bean, 1996; Walters, 1994) although those aimed at second language students are less common. Atkinson (1997, p.72) suggests critical thinking is a social practice that has its origins in culturally determined sets of behaviours that cannot be easily defined, and is, therefore 'unteachable'. Benesch (1993)calls critical thinking both 'a democratic learning process examining power relations and social inequalities' and rejects, as others do (eg. Gieve, 1998), Atkinson's claim that it can not be taught. Critical analysis in some academic fields is interpreted as a form of pervasive agonism or adversarial critique (Tannen, 2002), i.e. an attempt to expose the inherent weakness in writing by others. Swales and Feak (1994) also note that 'fairness' in terms of critique varies from field to field and that 'different fields are likely to impose different emphases on critiques' (p.132), suggesting that engineering and science focus more on the potential application of results than on either the quality of argument (Humanitiies), or methodologies (Social Sciences). For critical analysis, Ballard and Clanchy (1984, pp. 44-61; and see Bartlett et al., 1999) offer some appropriate clarification and examples. They highlight the need for a balance between factual analysis and judgment.

STUDENT RESPONSES TO CRITICAL WRITING

During the first week of the program all students are asked to complete a self-evaluation questionnaire of twenty language and academic skills deemed central to their learning, e.g paraphrasing, note-taking skills. Students must also supply a brief introduction identifying how such skills are relevant to their current and future studies. Here I select three representatives from the current cohort of students to illustrate the variety of

backgrounds and attitudes students bring to the program, and how they situate themselves in terms of the discourse community and genres they aim to work with.

Angela, Indonesian PhD student, has studied in Holland; research area Hydrology

Angela identifies herself as largely competent in academic and research skills areas, while highlighting language and 'writing skill' as the key issue for her to develop 'especially choosing vocabulary and article'. She suggests that her aim is to develop her skills up to 'publication writing', which will also help with her PhD thesis. She appears confident in interpreting the requirements of the local discourse community – supervisor, faculty - relevant to her research work, and has experience of presenting her work both in Indonesia and Holland. Angela submits a very competent review of an article on flood forecasting, which strikes a reasonable balance between summary and evaluation. Her use of language, as she identifies, is one of the key factors affecting the quality of this first assignment. In her second assignment, which compares two models to measure rainfall-runoff, her language error rate has improved, and ability to integrate evaluative commentary in her text is better than her previous assignment. In class, she is a confident presenter of her ideas, especially in group discussions. Her confidence, clear self-assessment, and developing writing skills evidenced in her assessments suggest further tasks will also be of a similar high quality and her work will serve as good models for other students for peer appraisal.

Hassan, Iranian PhD student, research area Weed Science

Hassan arrives somewhat late to the program, and visits me first with his wife, who is also university trained. Hassan is somewhat older than the other students in class, and also extremely circumspect in his interactions with me, largely, it seems, out of respect. He self-evaluates his academic skills as average to poor, although he demonstrates considerable skill in his assignments. Hassan has a background in teaching at university in Iran, and so identifies language and academic skills as important not only for his current studies but also 'they will help me to teach more efficient in the future'. He suggests that all articles in his field follow a fixed format: abstract, literature review, materials and methods, results and discussion, and his specific interest is to develop his skills in these areas 'so that I can write a scientific article printable on the valid journals'. Hassan, therefore, seems to have a clear concept of the genre and writing structures he wants to develop. He graciously claims that the course will lead to better presentations of his work, and in general, he adopts a deferential attitude to interaction with me. In class, he is not usually forthright but when given the opportunity to speak or present produces careful well-structured discourse. Both his first and second assignments are very competent pieces of writing both in terms of language skills and critical evaluation.

John, Chinese Coursework Masters student

John is one of the weakest students in terms of language proficiency and this is illustrated in his first and second assignments. I spend a long office hour with him prior to submitting his second assignment to simply clarify the language form and content of his essay. He will require substantial work to move his writing beyond competent description and summary writing, and it will be a significant achievement if he can attempt to integrate some critical examination of research texts. Rather than actually responding to the prompt to reflect on how academic skills relate to his current and future career, John comments on the form and purpose of self-evaluation surveys. He suggests that they provide a guide for the teacher in his interactions with students to 'do something special for student not only correcting problem but also make students satisfied', suggesting that they outline the curriculum. While his interpretation of the purpose of the evaluation sheet is quite accurate – its purpose is to suggest curriculum content – his inability to respond to the prompt already suggests difficulties with language proficiency, which are soon reinforced by his writing. John is completely silent on his relationship to the discourse community and the genres he is required to work with.

STUDENT REFLECTIONS ON CRITICAL ENGAGEMENT

As a review of the experiences of students with engaging in critical textwork, I survey students at the end of the program. The following are from the second semester 2002 cohort, and their responses to the following five questions, which focus both on the nature of critical thinking and writing in the course and their experience of

critical thinking in other engineering programmes.

1. What do you (now) understand as critical thinking and writing in English,
2. Do you think it is relevant to engineers in your field? If so, how and why? If not, why not?
3. Did your other engineering courses this semester require you to write and present critically? If it was different, how was it different?
4. How difficult (or easy) was it for you to understand what critical thinking and writing meant? Please explain why?
5. Do you think you have developed your ability to critically analyze and write through this course? If not, why not?

All students respond with a particular version of critical thinking as they have come to understand it, and most point to the fact that it was both relevant to their field, and that their other engineering courses included a focus on this. However, some students remained uncertain about what it meant. Shan from China, for example, notes that none of his other engineering subjects required critical thinking, that he wanted to develop his listening and speaking English skills (and did not), and that he remains uncertain about the understanding and practice of critical thinking in English 'Because in Chinese, critical means finding a mistake or finding some unreasonable words, not like that in English'. Shan, in fact, is one of a small group of students who relied extensively on translation and cultural parallels because of their limited English proficiency. As a result, their expectations that the course would be remedial Engineering English were frustrated.

Yang, also from China, also notes that none of his other subjects and assignment provided contexts for writing critically 'I have other three assignments in this semester. One require me to write case study about two motors companies, compare with the different strategic management of organizations. One is transport survey, design an survey form then collect the data, then summary and conclusion the result follow your research. The third one is related to study the new technology and policy in one field you select.' Given her descriptions of the task this seems surprising. Yang claims that none of these examples offered scope for critical examination of research issues. She also notes that the concept of critical thinking and writing was completely new, 'From the beginning, it is difficult for me to understand what critical thinking and writing meant, because I never study this before. It includes structure and what criteria can be used for evaluating an article, is special for me to argue the logic of the article'.

Daniel from Turkey notes that the form of critical thinking he has encountered seems specific to the Australian education system, rather than being universal, and that it requires he adapt, 'I can say that the way that we use to explain, can have a structure in different education systems. Our opinion should be explained in only common way which is already shaped . . . I don't think there is only one way of critical thinking and writing but I know that I have to use the appropriate one according to conditions that you are involved in, at that point I could adapt myself'. Daniel retains a sense of critical thinking that he believes is not covered by the Australian system, but he is prepared to adapt. His reference to the 'common way which is already shaped' may allude to his recognizing a predominant structuring of engineering text work which is based on English speaking practice. Daniel reserves the right to challenge the universality of this approach.

Chan, from China, notes that his difficulties with language made it hard for him to engage with critical textwork; he also suggests that from this point of view more class discussion and debate would have helped, the language barrier still is the main problem. 'The critical thinking and writing will help me in improving my language through a lots of reading, thinking, and writing. It is better have more opportunities to present ideas or discuss in class.' At the same time he associates critical thinking and writing with problem solving such as he had to manage in his other courses. 'Every project needs to solve problems in a particular area and not all the problems are provided by the lecturer. We must find problems and solve it. critical thinking is extremely useful.' This association between critical textwork, independent study, and problem solving in engineering is not a connection I highlighted but obviously one that Chan believes is relevant.

Renata from Germany works in the field of medical technology and critical thinking is essential, 'because so many aspects are involved in that field.', in particular human risks. She makes the point that she came to the course with an existing conception of critical thinking, which included the need to read between the lines.

'Critical thinking and writing in English for me is firstly, not only reading and understanding a text, also to reflect critically about what is written. Secondly, to write in a formal, academic way. Summarize the main points and discuss problems and gaps in literature.' Despite her prior experience, she suggests the course provided new insights, 'In the course I learnt different ways how to do this, and also how to write critical academic papers.' The challenge for her, she suggests, is that critical thinking is not a set of rules one can follow 'It was still a bit difficult for me, because there are no real rules how to be critical. It is not like in Maths where there are strict rules.' Her reflection, which I find particularly insightful, is both a reflection of the need she had to negotiate a form of critical thinking and writing appropriate to the course, that such a negotiated definition is based on principles rather than rules, and that, as a corrollary, prescriptive definitions of what critical thinking and writing is cannot claim universality.

Radi, a PhD student from Indonesia notes that one of her key aims was to write critically using 'the international pattern', highlighting, in fact, that international implies Western-oriented practices. She notes that to write critically in English often requires more explanation than her assumption about shared knowledge between her and the reader suggests 'The difficult thing is sometimes I think it may no need further explanation, in English it needs more explanation.' Like Chan above and several other students surveyed she indicates that critical writing requires a level of language proficiency that she still struggles with, 'the pattern of building a good sentences in English is sometimes still confusing me. Perhaps, I need more practice about it'. Although she appreciates what she has learned she suggests that a greater focus on research genres such as journal articles would help, 'This course is good to develop my ability to analyze and write critically as English pattern. I suggest for next semester, teacher can give more example for writing a report, thesis, journal and paper.' This desire for explicit focus on research genres is one of the outcomes of the expansion of the course to include research only students, and suggests the need for a more complex.

CONCLUSIONS

The program continues to evolve with increasing participation of students and faculty. Numbers in the program have risen over the last three semesters from twenty two to thirty nine currently; numbers are projected to rise in the near future. Student evaluations have been consistently positive, and I meet regularly with the Faculty of Electrical Engineering to discuss progress on the course. Faculty involvement and support has been critical to success. The recent inclusion of research alongside coursework students has produced a slight tension that may need resolving in favour of a separate program. A key element in the success of the program has been the ability to negotiate appropriate forms of writing in a selection of academic genres used for assessment. The focus on conventions and principles of academic writing as the outcome of students' engagement with authentic genres has helped ground the course in content relevant to the current and future aims of students. My reading of the authentic genres that students have to manage has helped provide me with a broad understanding of the content and disciplinary differences among sub-disciplines of engineering, and helps substantiate my educated expert status with students, which is important in conducting the learning-centred approach.

Building a 'bridge' between language and engineering (Pattison, 1994), and 'dovetailing' language and content (Bruce, 2002) with students from a variety of sub-disciplines and cultures cannot stand on generalist assumptions about academic language and skills. A number of proposals have been made for collaboration between language specialists and Engineering faculty (Pattison, 1994), or for successfully combining language with professional discipline instruction, which aim to negotiate better curriculum outcomes for students. There have also been calls for Engineers in particular to take more seriously the clarity of their communication through English (Oakley, 1998). For the EAP lecturer, the process of attaining a form of literacy in the discipline, as Collins, Li and Cheung (Collins, Li, & Cheung, 2000) point out, takes time and effort. The pragmatic compromises on which the program described here is based have helped, I believe, develop a learning community guided by the principle of clearly communicating about authentic genres to an audience of peers from the broad discipline of engineering and science, and a non-engineer initiating students into the academic discourse community through legitimate peripheral participation in a situated learning-centred program.

As a non-engineer I bring an interpretation of critical literacy to teaching informed by my own backgrounds in linguistics and education. Despite the fact some claim that humanities and engineering disciplines have shared goals (Arms, Duerden, Green, KIllingsworth, & Taylor, 1998), as Silyn-Roberts (Silyn-Roberts, 1997) notes

traditional 'remedial' composition classes may use genres, e.g. essay, which are of little relevance and confusing to students in their expectations. Negotiating critical textwork with students, however, is not without challenges. Students come with varying expectations and proficiencies, which affect the kind of engagement they can achieve with the genres and sub-genres used for assessment purposes. The balance between language and critical skills continues to be a subject of debate, and will become increasingly important as research students participate in the course.

Adam, C., & Artemeva, N. (2002). Writing Instruction in English for Academic Purposes (EAP) Classes: Introducing Second Language Learners to the Academic Community. In A. M. Johns (Ed.), Genre in the classroom : multiple perspectives (pp. 179-196). Mahwah, N.J.: L. Erlbaum.

Allen, M. (1997). Smart thinking : skills for critical understanding and writing. Melbourne: Oxford University Press.

Alley, M. (1996). The craft of scientific writing (3rd ed.). New York: Springer.

Alley, M. (2003). The craft of scientific presentations : critical steps to succeed and critical errors to avoid. New York: Springer.

Arms, V. M., Duerden, S., Green, M., KIllingsworth, M. J., & Taylor, P. (1998). English Teachers and Engineers: A New Learning Community. International Journal of Engineering Education, 14(1), 30-40.

Atkinson, D. (1997). A critical approach to critical thinking in TESOL. TESOL Quarterly, 31(1), 71-94.

Baker, M. O. (1989). Critical thinking activities to improve writing skills : arguments A-1; a fully reproducible book. Cheltenham, Vic.: Hawker Brownlow Education.

Ballard, B., & Clanchy, J. (1984). Study abroad : a manual for Asian students. Kuala Lumpur: Longman.

Bartlett, A., Holznkechy, S., & Thom, A. C. (1999). Preparing Students for Graduate Study: to hit the ground running - a student workbook. Canberra: Asia Pacific Press

National Centre for Developmental Studies, Australian National University.

Bean, J. C. (1996). Engaging ideas : the professor's guide to integrating writing, critical thinking, and active learning in the classroom (1st ed.). San Francisco: Jossey-Bass.

Benesch, S. (1993). Critical thinking: a learning process for democracy. TESOL Quarterly, 27(3), 545-547.

Biggs, J., Lai, P., Tang, C., & Lavelle, E. (1999). Teaching writing to ESL graduate students: A model and an illustration. British Journal of Educational Psychology, 69(3), 293-306.

Bruce, N. (2002). Dovetailing language and content: teaching balanced argument in legal problem answer writing. English for Specific Purposes, 21(4), 321-345.

Collins, R., Li, S., & Cheung, D. (2000). Language professionals in engineering faculty: cross-cultural experience. Journal of Professional Issues in Engineering Education and Practice, 126(1), 32-34.

Dong, Y. R. (1998). Non-native graduate students' thesis/dissertation writing in science: self-reports by students and their advisors from two US institutions. English for Specific Purposes, 17(4), 369-390.

Facione, P. A. (1998). Critical Thinking: What It Is and Why It Counts (1998 Update ed., pp. 1-16): California Academic Press.

Feak, C. B. (1996). Review: Oxford English for electrical and mechanical engineering. English for Specific Purposes, 15(4), 325-327.

Gieve, S. (1998). A reader reacts [...] a comment on Dwight Atkinson's 'A critical approach to critical thinking in TESOL'. TESOL Quarterly, 32(1), 123-129.

Glendinning, E. H., & Glendinning, N. (1995). Oxford English for electrical and mechanical engineering. Oxford: Oxford University Press.

Gopen, G. D., & Swan, J. A. (1990). The Science of Scientific Writing. American Scientist, 78(Nov-Dec 1990), 550-558.

Hawthorne, L. (1997). Defining the target domain: what language skills are required of engineers and nurses? Melbourne Papers in Language Testing, 6(1), 5-18.

Hyland, K. (1999). Academic attribution: Citation and the construction of disciplinary knowledge. Applied Linguistics, 20(3), 341-367.

Hyland, K., & Hamp-Lyons, L. (2002). EAP: issues and directions. Journal of English for Academic Purposes, 1(1), 1-12.

Johnson, C. M., & Johnson, D. (1988). General Engineering. London, UK: Cassell.

Kschischang, F. R. (2000, September 24, 2000). Giving a Talk: Guidelines for Preparation and Presentation

of Technical Seminars [PDF]. Kschischang, Frank R. Retrieved 26/02/02, 2002, from the World Wide Web:

Melles, G. (2002, 30 September - 2 October). Presenting Academic Discourse: ESL meets Postgraduate Engineering - work in progress. Paper presented at the 13th Annual Conference for Australian Association for Engineering Education and 8th Australasian Women in Engineering Forum, Canberra, ACT.

Oakley, B. A. (1998). Leading Engineers towards English. Paper presented at the 1998 Frontiers in Education.

Pattison, A. (1994). Building bridges: a new joint language and engineering degree program. Babel, 29(1), 30-31.

Silyn-Roberts, H. (1997). The report and the essay: are we muddling science and engineering undergraduates by asking them to write in two different genres? Paper presented at the In `Selected proceedings of the First National Conference on Tertiary Literacy: research and practice', volume 2, pages 240-247, edited by Z Golebiowski and H Borland. Melbourne: Victoria University of Technology. Cover title: Academic communication across disciplines and cultures 1997.

Silyn-Roberts, H. (2000). Writing for science and engineering : papers, projects & proposals : a practical handbook for postgraduates in science, engineering and technology. Oxford: Butterworth-Heinemann.

Spack, R. (1988). Initiating ESL students into the academic discourse community: How far should we go? TESOL Quarterly, 21, 41-68.

Starfield, S. (2001). 'I'll go with the group': Rethinking 'discourse community' in EAP. In M. Peacock & J. Flowerdew (Eds.), Research perspectives on English for academic purposes (pp. 132-147). Cambridge: Cambridge University Press.

Swales, J., & Feak, C. B. (1994). Academic writing for graduate students : essential tasks and skills : a course for nonnative speakers of English. Ann Arbor: University of Michigan Press.

Tannen, D. (2002). Agonism in academic discourse. Journal of Pragmatics, 34(10-11), 1651-1669.

Thompson, P., & Tribble, C. (2001). Looking at Citations: Using Corpora in English for Academic Purposes. Language, Learning & Technology, 5(3), 91-105.

Tribble, C., & Thompson, P. (2001). Looking at citations: using corpora in English for Academic Purposes. Langauge, Learning & Technology, 5(3), 91-105.

Walters, K. S. (1994). Re-thinking reason : new perspectives in critical thinking. Albany: State University of New York Press.

Ward, J. (2001). EST: evading scientific text. English for Specific Purposes, 20(2), 141-152.

Williams, J. M. (2000). Style : ten lessons in clarity and grace (6th ed.). New York: Longman.